

REMARKS

Claims 1-40 are now pending in the application. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

Claim Objections

Claims 5-21 and 26-39 are objected to because of the following informalities:
Claims 5-21 and 26-39 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim.

Applicant has amended Claims 5, 7, 10-13, 15, 16, 19-21, 26, 29, 31-34, 38, and 39 to remove the multiple dependencies upon multiple dependencies.

Rejection Under 35 U.S.C. § 103

Claims 1-4, 22 and 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Pollock (U.S. Pat. No. 6,140,729) in view of Byrne (U.S. Pat. No. 4,670,696). This rejection is respectfully traversed.

Independent Claims 1 and 22 describe a respective apparatus and a method for an electrical machine. The electrical machine includes, *inter alia*, position sensing means for detecting at least one induced first electrical signal dependent on rotational position of a rotor relative to a stator. The said induced first electrical signal is induced

in a respective one of said windings by a voltage across at least one other of said windings. The voltage is a requirement of normal operation of the machine to convert electrical energy into mechanical energy and/or mechanical energy into electrical energy.

In other words, position sensing means detects an electrical signal that is dependent on the rotational position of the rotor and that is induced in a winding of the stator during normal operation. Applicant respectfully submits that none of the cited references disclose a position sensing means that senses the rotor position based on an induced voltage in a stator winding. Instead, the references disclose electrical machines that include a position sensor that is mechanically referenced to the stator and detects rotation of the rotor. The references therefore disclose machines that fall within the prior art described in the specification at the last paragraph of page 3 though the second paragraph of page 4.

To establish a *prima facie* case of obviousness the combination of prior art references must teach or suggest all the claim limitations. MPEP 2143.03.

The Examiner relies on Pollock, col. 6, lines 6-20-32, to provide the Applicant's claimed position sensing means. As best understood by the Applicant, Pollock merely discloses a position sensor of the prior art. Pollock states, ". . . the angular position of the rotor as sensed by a position detector, for example a single bit optical position sensor for optically detecting markings applied to the rotor shaft . . ." Pollock therefore

describes a prior art position sensing means. Pollock does not teach or suggest detecting an electrical signal that is dependent on the rotational position of the rotor and that is induced in a winding of the stator. The position signal of Pollock is induced in the position sensor instead of in a winding of the stator as claimed by the Applicant. Pollock therefore cannot teach or suggest the Applicant's position sensing means.

With regard to Byrne et al., the Examiner relies on Fig. 12, item 25 and column 23, lines 36-42, to provide the position sensing means. Again, position sensor 25 is a prior art position sensor that is associated with a shaft of a reluctance motor 23 (also shown and described in the cited portions of Byrne et al.) The position signal of Byrne et al. is provided by the position sensor instead of in a winding of the motor stator as claimed by the Applicant. Byrne et al. therefore does not make up for the shortcomings of Pollock as a reference as it cannot teach or suggest the Applicant's position sensing means.

For the above reasons applicant respectfully submits that Claims 1 and 22 are in a condition for allowance. Claims 2-21 and 23-39 depend either directly or indirectly from Claims 1 and 22 and are therefore believed to be in a condition for allowance for at least the same reasons as Claims 1 and 22.

Claim 40 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Christian (U.S. Pat. No. 4,031,440) in view of Byrne. This rejection is respectfully traversed.

Claim 40 describes, *inter alia*, a method of determining a rate of change of current in at least one winding of an electrical machine. The method includes monitoring a voltage induced in at least one respective coil magnetically coupled to a magnetic field generated by a conductor carrying the current in the at least one winding of the machine.

Applicant respectfully submits that none of the cited references discloses monitoring a voltage induced in coil that is magnetically coupled to a conductor that carries current *in a winding of a machine*. As best understood by the Applicant, Christian discloses a control circuit (Fig. 2, item 26) that is magnetically coupled (28) to control windings (27). Control windings (27) do not carry the motor current. Instead, they carry a current that indicates a transient loading on the motor (Abstract).

To establish a *prima facie* case of obviousness the combination of prior art references must teach or suggest all the claim limitations. MPEP 2143.03.

The Examiner relies on Christian, col 3, lines 21-28 to provide the Applicant's method of monitoring a voltage induced in at least one respective coil magnetically coupled to a magnetic field generated by a conductor carrying the current in the at least one winding of the machine. As best understood by the Applicant, the cited portion of Christian describes a series connection of a DC generator (10) and a DC motor (11). Also in series with generator 10 and motor 11 is a series pair of compensating field windings (13) and (22) that carry the motor and generator current. Conductors make

the series connections of generator (10), motor (11), and field windings (13) and (22). A magnetic field surrounds the conductors, however Christian does not teach or suggest coupling a coil into that magnetic field. Christian therefore cannot teach or suggest the Applicant's monitoring a voltage induced in at least one respective coil magnetically coupled to a magnetic field generated by a conductor carrying the current in the at least one winding of the machine.

For these reasons Applicant respectfully submits that Claim 40 is in a condition for allowance.

Allowable Subject Matter

The Examiner states that claims 24 and 25 would be allowable if rewritten in independent form. Applicant takes the Examiner's finding under advisement and respectfully refrains from amending the Claims until the Examiner has an opportunity to reply to the comments and amendments in this paper.

Conclusion

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office

Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

In view of the above amendment, applicants believe the pending application is in condition for allowance.

Applicants believe no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 02-2548, under Order No. 0275K-001364/US from which the undersigned is authorized to draw.

Dated: 0/3/2007

Respectfully submitted,

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